

REMARKS

The application is believed to be in condition for allowance.

At the onset, applicants wish to express their appreciation for the personal interview conducted by Examiner McHenry with the undersigned attorney. The time and attention of the Examiner is gratefully acknowledged.

Claims 1, 2, 7-9, 15, 16 and 18-25 are present in the application. Claims 3-6 and 10-14 have been previously cancelled. Claims 26-28 are presently cancelled.

Claims 1, 2, 7-9, 15, 22, 23, and 25 were rejected under 35 USC 103(a) as being unpatentable over HAMASAKI 4,507,540 in view of STEEN 4,167,662 and YENNI et al. 2,753,427; CHERNE et al. 4,871,898; or GALANTINO et al 4,749,841.

Claims 16, 18, and 19 were rejected under 35 USC 103(a) as being unpatentable over HAMASAKI in view of STEEN and YENNI et al., CHERNE et al., or GALANTINO et al., in further view of BEYER et al. 5,821,493.

Claim 20 was rejected under 35 USC 103(a) as being unpatentable over HAMASAKI in view in view of STEEN and YENNI et al., CHERNE et al., or GALANTINO et al., in further view of COOK 2,790,656.

Claims 1, 2, 7-9, 15, 22, and 24 were rejected under 35 USC 103(a) as being unpatentable over HAMASAKI in view of STEEN and GALANTINO 4,902,866.

Claims 16, 18, and 19 were rejected under 35 USC 103(a) as being unpatentable over HAMASAKI in view of STEEN and GALANTINO, in further view of BEYER et al.

Claim 20 was rejected under 35 USC 103(a) as being unpatentable over HAMASAKI in view of STEEN and GALANTINO, in further view of COOK.

Claim 1 recites hybrid laser-arc welding of steel with a ternary gas mixture consisting of argon, helium and either O₂ or CO₂.

As has been acknowledged, there is no prior art teaching the use of the recited ternary gas mixture in laser-arc welding, yet alone with steel.

There is no dispute as to the advantages of the recited method. Tables on pages 12 and 13 of the specification are acknowledged to indicate that very good results are obtained when using such ternary gas mixtures for welding either carbon steel or stainless steel pieces.

The disputed issue is whether any of the applied prior art documents render obvious the use of the recited ternary gas mixture consisting of argon, helium and either O₂ or CO₂ for laser-arc hybrid welding of steel pieces.

HAMASAKI discloses hybrid welding of steel pieces using various gas mixtures, but no ternary gas mixtures and specifically, not the recited ternary gas mixture and not the

specific amounts of the different gases of the gas mixtures as recited.

Applicants acknowledge that laser-arc hybrid welding of steel is known. As discussed in the interview; however, what is not known is the results of mixing prior art techniques found in either laser welding or arc welding. It is known that the prior art laser welding and arc welding techniques do not have the same results and characteristics when applied to laser-arc hybrid welding.

Indeed, laser and arc welding are two very different welding processes such that when arc welding and laser welding are combined, it is often uncertain how they will affect each other. For example, during the interview, an article published subsequent to the present invention stated that the interaction between these two types of welding is uncertain. For example, it is noted that mixing of the filler wire within a hybrid molten pool is uncertain. The laser penetrates to form a deep, narrow molten pool, but the filler wire added with the arc will not necessarily mix thoroughly all the way down the penetration finger before solidification occurs. This particular example is mentioned to illustrate that from a technical point of view, arc welding processes are different from laser welding processes, and both are different from hybrid laser-arc welding processes. This means that those skilled in the art understand that what may be

"true" in arc welding cannot be assumed to be "true" in laser welding or in hybrid welding.

As discussed during the interview, especially in hybrid welding, the fact that the laser is enhanced by an electric arc involves particular phenomena which are not pre-visible or foreseeable in that these phenomena do not exist when laser welding or arc welding individually. As a consequence, it would be erroneous to consider any gas mixture usable in arc welding is automatically usable in hybrid welding.

One good example is given by the public release of The Welding Institute dated 2002 (provided in the last amendment), where TWI surprisingly discovered that Ar/He/CO₂ mixtures were particularly efficient in hybrid welding. See that, as explained by the TWI, when hybrid welding some particular problems arise such that process stability and weld penetration, as well as welding speed, require attention.

Applicants ask that special attention be given to the knowledge level that was present at the time of the invention so as to avoid impermissible hindsight obtained from the present application or subsequent developments in the art.

Keeping this in mind, HAMASAKI concerns improvements in hybrid welding processes in order to improve process stability, weld penetration, and welding speed. This reference is totally void of teachings or suggestions to use a ternary gas mixture. Applicants acknowledge that the cited secondary references, when

disclosing either arc or laser welding processes, teach ternary gas mixtures. Note, however, that none of these references concern hybrid welding or suggest hybrid welding. In summary, none of these references teach a benefit of using a ternary gas to improve hybrid welding.

As further evidence that the prior art did not appreciate using ternary gas mixtures in hybrid welding, note that all of the prior art cited in the prosecution that does mention hybrid welding, fails to teach or suggest ternary mixtures of gas.

Thus, in each instance where hybrid welding is disclosed in the prior art, there is no disclosure of using a ternary gas, and in any instance where a ternary gas is disclosed, there is no disclosure using such gas in hybrid welding. Applicants believe that this clearly points to the prior art not appreciating any benefit from using ternary gases in conjunction with hybrid welding.

In this case, the present disclosure is effectively being used to render the claimed invention obvious. Such an approach is not permitted.

Relevant to this point, the Federal Circuit has emphasized in July, 1998 that "[m]ost, if not all, inventions are combinations and mostly of old elements." *In re Rouffett*, 47 USPQ 2d 1453, 1457 citing to *Richdel, Inc. v. Sunspool Corp.*, 219 USPQ 8, 12 (Fed. Cir. 1983). The Federal Circuit continued by noting

that "rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blue print for piecing together elements in the prior art to defeat the patentability of the claimed invention."

Thus, the Federal Circuit requires that in order to prevent the use of such hindsight, the Official Action must "show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." (*In re Rouffett* at 1458).

As stated by MPEP §706.02(j), to establish a *prima facie* case of obviousness the Official Action must first, consider the relevant teachings of the prior art, and after determining the differences between the pending claim and the prior art teachings, second, propose modifications of the prior art necessary to arrive at the claimed subject matter, explaining the motivation for combining the particular references and making the proposed modifications to those references. Thus, there must be motivation to modify the references and a teaching or suggestion of **all** the claim recitations.

Applicants respectfully request reconsideration taking into account the relevant teachings of the prior art, appreciating the fact that the prior art, although aware of the

use of ternary gas mixtures for arc welding, fails in any instance to suggest such use in hybrid welding, and avoiding the use of hindsight as the basis for stepping from the prior art level of hybrid welding to that recited by the present invention.

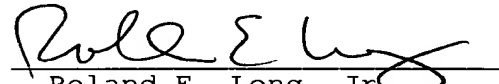
In light of the above amendments and remarks, applicants believe that the present application is in condition for allowance and an early indication of the same is respectfully requested.

If the Examiner has any questions or requires clarification of any of the above points, the Examiner may contact the undersigned attorney so that this application may continue to be expeditiously advanced.

Respectfully submitted,

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